

## AMENDMENT (1)

## Claims

1. (Amended) A compact self-ballasted electrodeless discharge lamp comprising:

5 a bulb filled with discharge gas containing mercury enclosed in the bulb in the form of mercury element, not in the form of amalgam, and a rare gas;

an excitation coil installed near the bulb;

a ballast circuit which supplies high frequency power to the excitation coil; and

a base that is electrically connected to the ballast circuit,

10 wherein: the bulb, the excitation coil, the ballast circuit and the base are formed into an integral part;

the bulb has a virtually spherical shape or a virtually ellipsoidal shape;

a recessed portion to which the excitation coil is inserted is formed on the ballast circuit side of the bulb;

15 the recessed portion has an opening section on the ballast circuit side, and has a tube shape with a virtually round shape in the cross section thereof, with a portion positioned on the side opposite to the opening section of the recessed portion being provided with a function for suppressing the convection of the discharge gas;

the largest diameter of the bulb is set in a range from not less than 60 mm to not  
20 more than 90 mm;

the bulb wall loading of the bulb during a stable lighting operation is set in a range from not less than  $0.07 \text{ W/cm}^2$  to not more than  $0.11 \text{ W/cm}^2$ ;

the ratio ( $h/D$ ) of the height ( $h$ ) of the bulb based upon the end face of the opening section in the recessed portion to the largest diameter ( $D$ ) of the bulb is set in a range from  
25 not less than 1.0 to not more than 1.3; and

supposing that a distance between a top face of the recessed portion positioned on the side opposite to the opening section of the recessed portion and a top portion of the bulb facing the top face of the recessed portion is  $\Delta h$ , and that a diameter of a portion positioned on the side opposite to the opening section of the recessed portion is  $D_c$ , the following relationship is satisfied:  $\Delta h \leq 1.15 \times D_c + 1.25$  [mm].

2. The compact self-ballasted electrodeless discharge lamp of claim 1, wherein the diameter  $D_c$  and the distance  $\Delta h$  satisfy the following relationship:  $\Delta h \geq 1.16 \times D_c - 17.4$  [mm].

3. The compact self-ballasted electrodeless discharge lamp of claim 1 or 2, wherein the largest diameter of the bulb is set in a range from not less than 65 to not more than 80 mm.

4. The compact self-ballasted electrodeless discharge lamp of any one of claims 1 to 3, wherein: the excitation coil is constituted by a core and a coil wound around the core; and the center portion of the portion around which the coil is wound in the longitudinal direction of the core is positioned within a range that is apart from the plane on which the largest diameter of the bulb is located by a distance from not less than 8 mm to not more than 20 mm toward the ballast circuit side.

5. (Amended) A compact self-ballasted electrodeless discharge lamp comprising:  
a bulb filled with discharge gas containing mercury enclosed in the bulb in the form of mercury element, not in the form of amalgam, and a rare gas;  
an excitation coil installed near the bulb;

a ballast circuit which supplies high frequency power to the excitation coil; and

a base that is electrically connected to the ballast circuit,

wherein: the bulb, the excitation coil, the ballast circuit and the base are formed into an integral part;

5 the bulb has a virtually spherical shape or a virtually ellipsoidal shape;

a recessed portion to which the excitation coil is inserted is formed on the ballast circuit side of the bulb;

the recessed portion has an opening section on the ballast circuit side, and has a tube shape with a virtually round shape in the cross section thereof, with a portion  
10 positioned on the side opposite to the opening section of the recessed portion being provided with a function for suppressing the convection of the discharge gas;

the largest diameter of the bulb is set in a range from not less than 55 mm to not more than 75 mm;

the bulb wall loading of the bulb during a stable lighting operation is set in a range  
15 from not less than  $0.05 \text{ W/cm}^2$  to less than  $0.07 \text{ W/cm}^2$ ;

the ratio ( $h/D$ ) of the height ( $h$ ) of the bulb based upon the end face of the opening section in the recessed portion to the largest diameter ( $D$ ) of the bulb is set in a range from not less than 1.0 to not more than 1.3; and

supposing that a distance between a top face of the recessed portion positioned on  
20 the side opposite to the opening section of the recessed portion and a top portion of the bulb facing the top face of the recessed portion is  $\Delta h$ , and that a diameter of a portion positioned on the side opposite to the opening section of the recessed portion is  $D_c$ , the following relationship is satisfied:  $\Delta h \leq 1.92 \times D_c - 22.4 \text{ [mm]}$ .

25 6. The compact self-ballasted electrodeless discharge lamp of claim 5, wherein the

diameter  $D_c$  and the distance  $\Delta h$  satisfy the following relationship:  $\Delta h \geq 1.16 \times D_c - 17.4$  [mm].

7. The compact self-ballasted electrodeless discharge lamp of claim 5 or 6,  
5 wherein the largest diameter of the bulb is set in a range from not less than 60 mm to not more than 70 mm.

8. The compact self-ballasted electrodeless discharge lamp of any one of claims 5  
to 7, wherein: the excitation coil is constituted by a core and a coil wound around the core;  
10 and the center portion of the portion around which the coil is wound in the longitudinal direction of the core is virtually positioned on a plane within which the largest diameter of the bulb is located.

9. (Deleted)

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10. (Amended) The compact self-ballasted electrodeless discharge lamp of any  
one of claims 1 to 8, wherein the filling pressure of the rare gas is set in a range from not  
less than 60 Pa to not more than 300 Pa.

20 11. (Amended) The compact self-ballasted electrodeless discharge lamp of any  
one of claims 1 to 8 or 10, wherein a phosphor layer is formed on an inner surface of the  
bulb.

25 12. (Amended) The compact self-ballasted electrodeless discharge lamp of any  
one of claims 1 to 8 or 10 or 11, wherein the diameter  $D_c$  of a portion positioned on the

side opposite to the opening section of the recessed portion is greater than the diameter of a portion corresponding to virtually the center portion of the recessed portion in the longitudinal direction of the excitation coil.

5 13. (Amended) An electrodeless-discharge-lamp lighting device comprising:

a bulb which is filled with discharge gas containing mercury enclosed in the bulb in the form of mercury element, not in the form of amalgam, and a rare gas, and which has a recessed portion;

an excitation coil inserted in the recessed portion; and

10 a ballast circuit which supplies high frequency power to the excitation coil,

wherein: the bulb has a virtually spherical shape or a virtually ellipsoidal shape;

the recessed portion has an opening section on the ballast circuit side, and has a tube shape with a virtually round shape in the cross section thereof;

the largest diameter of the bulb is set in a range from not less than 60 mm to not  
15 more than 90 mm;

the bulb wall loading of the bulb during a stable lighting operation is set in a range from not less than  $0.07 \text{ W/cm}^2$  to not more than  $0.11 \text{ W/cm}^2$ ;

the ratio ( $h/D$ ) of the height ( $h$ ) of the bulb based upon the end face of the opening section in the recessed portion to the largest diameter ( $D$ ) of the bulb is set in a range from  
20 not less than 1.0 to not more than 1.3; and,

supposing that a distance between a top face of the recessed portion positioned on the side opposite to the opening section of the recessed portion and a top portion of the bulb facing the top face of the recessed portion is  $\Delta h$ , and that a diameter of a portion positioned on the side opposite to the opening section of the recessed portion is  $D_c$ , the  
25 following relationship is satisfied:  $\Delta h \leq 1.15 \times D_c + 1.25 \text{ [mm]}$ .

14. (Amended) An electrodeless-discharge-lamp lighting device comprising:

a bulb which is filled with discharge gas containing mercury enclosed in the bulb in the form of mercury element, not in the form of amalgam, and a rare gas, and which has  
5 a recessed portion;

an excitation coil inserted in the recessed portion; and

a ballast circuit which supplies high frequency power to the excitation coil,

wherein: the bulb has a virtually spherical shape or a virtually ellipsoidal shape;

the recessed portion has an opening section on the ballast circuit side, and has a  
10 virtually cylinder shape with a virtually round tube shape in the cross section thereof;

the largest diameter of the bulb is set in a range from not less than 55 mm to not more than 75 mm;

the bulb wall loading of the bulb during a stable lighting operation is set in a range from not less than  $0.05 \text{ W/cm}^2$  to less than  $0.07 \text{ W/cm}^2$ ;

15 the ratio ( $h/D$ ) of the height ( $h$ ) of the bulb based upon the end face of the opening section in the recessed portion to the largest diameter ( $D$ ) of the bulb is set in a range from not less than 1.0 to not more than 1.3; and,

supposing that a distance between a top face of the recessed portion positioned on the side opposite to the opening section of the recessed portion and a top portion of the  
20 bulb facing the top face of the recessed portion is  $\Delta h$ , and that a diameter of a portion positioned on the side opposite to the opening section of the recessed portion is  $D_c$ , the following relationship is satisfied:  $\Delta h \leq 1.92 \times D_c - 22.4 \text{ [mm]}$ .

15. The electrodeless-discharge-lamp lighting device of claim 13 or 14, wherein  
25 the diameter  $D_c$  of a portion positioned on the side opposite to the opening section

of the recessed portion is greater than the diameter of a portion corresponding to virtually the center portion of the recessed portion in the longitudinal direction of the excitation coil.